CLAIMS

1. An indirect x-ray image detector suitable for radiology, comprising an active matrix substrate with scanning and read-out circuits, wherein over said active matrix substrate there is deposited a photoreceptor made of a co-planar thin layer of amorphous selenium based multilayer structure, said photoreceptor being covered with a light-transparent biasing electrode on top of which there is provided an x-ray conversion scintillator.

2. An x-ray image detector according to claim 1, in which the active matrix substrate is a two dimensional array of thin film transistors (TFT) associated with a storage capacitance and having conduction pads with electric connection to the photoreceptor.

3. An x-ray image detector according to claim 2, in which the storage capacitance is a part of the TFT architecture.

4. An x-ray image detector according to claim 2, in which the storage capacitance is an integral part of the photoreceptor.

5. An x-ray image detector according to claim 2, in which the TFT are made of amorphous silicon.

6. An x-ray image detector according to claim 1, in which the photosensitive selenium multilayer structure is of n-i-p or p-i-n type, wherein the n-layer is a hole blocking layer, the p-layer is an electron blocking layer and the i-layer sandwiched between the n and p layers is an amorphous selenium layer doped with chlorine and arsenic.

7. An x-ray image detector according to claim 6, wherein the i-layer of

amorphous selenium is doped with 1-100 ppm of chlorine and 0.1 - 5% by wt. of arsenic.

8. An x-ray image detector according to claim 6, in which the n-layer is a thin selenium layer doped with an alkaline metal or an oxide or halogenide of said metal.

9. An x-ray image detector according to claim 8, in which the alkaline metal is selected from lithium, sodium, potassium and cesium.

10. An x-ray image detector according to any one of claim 6, in which the p-layer is a thin layer of arsenic enriched amorphous selenium.

11. An x-ray image detector according to claim 10, in which the arsenic enrichment of the p-layer is 1-38% by wt.

12. An x-ray image detector according to claim 6, in which each of the n and p layers is less than 1 μm in thickness.

13. An x-ray image detector according to claim 1, in which the thickness of the multilayer structure of the photoreceptor is 2-50 μm.

14. An x-ray image detector according to claim 13, in which said thickness of the multilayer structure is 5 to 20 μm.

15. An x-ray image detector according to claim 6, in which the light transparent biasing electrode is a co-planar indium tin oxide (ITO) layer positioned on top of the selenium based multilayer structure.

16. An x-ray image detector according to claim 6, in which the selenium based multilayer structure is of the p-i-n type and the light transparent biasing electrode is set to a negative potential to provide the TFT with high voltage protection.

17. An x-ray image detector according to claim 6, in which the selenium based

multilayer structure is of the n-i-p type, and wherein a high voltage protective device is also provided shunting the storage capacitance.

18. An x-ray image detector according to claim 1, in which the biasing electrode also serves to match indices of refraction of the scintillator and the selenium based multilayer structure.

19. An x-ray image detector according to claim 1, in which the selenium based multilayer structure is optimized for electrical transport where dark current is below 200pA/cm^2 and residual image is less than 5%.

20. An x-ray image detector according to claim 1, in which the scintillator is made of a material selected from cesium iodide doped with sodium, as well as from barium fluoride, calcium tungstate and sodium iodide, emitting in the blue spectrum.

21. An x-ray image detector according to claim 1, in which the photoreceptor of selenium based multilayer, the biasing electrode and the scintillator are enclosed in a housing providing environmental, electric and mechanical protection.